UN/ECE Technical Service No. E8/C and E27/J

TECHNICAL REPORT
No. CS256-23-TAC

Test according to UN Regulation No. 148.00, 149.00

Uniform provisions concerning the approval of lighting devices designed for the front of the vehicles

UN Regulation No. 148.00 – date of entry into force: 2019-11-15
UN Regulation No. 149.00 – date of entry into force: 2019-11-15
including all amendments up to and including:
UN Regulation No.148.00, supplement 04 – date of entry into force: 2022-10-08
UN Regulation No.149.00, supplement 05 – date of entry into force: 2022-10-08

Objectives: Document for issue of approval certificate

I. Technical data

0.1.	Make (trade name of manufacturer):	MD
0.2.	Type:	HLY002
0.2.1.	Variants:	N/A
0.3.	Means of identification of type:	By digits and letters, HLY002
0.3.1.	Location of that marking:	On the housing
0.4.	Kind of the lighting device:	Front group lamp – front position lamp MA, headlamp with a driving beam and a symmetrical passing beam. Headlamp is Class CS.
0.5.	Name and address of manufacturer:	AJ MOTORSPORT LLC 10166 OLNEY ST EL MONTE, CA 91731-2312
0.8.	Address of assembly plant:	10166 OLNEY ST EL MONTE, CA 91731-2312
0.9.	Location of the approval mark:	On the lens

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II. Test report

1. Test conditions

1.1.	Test sample:	Two samples of type: HLY002 Marking: Sample No. 1 and Sample No. 2
1.1.1.	Technical data from the manufacturer:	Testing laboratory does not bear any responsibility for possibly incorrect values provided by the manufacturer and for test results found out based on these values.
1.2.	Test procedures used:	According to UN Regulations No. 148.00, 149.00
1.3.	Measuring and test equipment:	Full automatic photometric test system for automobile lamps EVERFINE PHOTO-E-INFO CO., LTD. Type GO-HD5
1.4.	Worst case evaluation:	Single case – no variant.
1.5.	Testing conditions:	The tests were carried out under supervision of the representative TÜV SÜD Czech s.r.o. in lab below.
1.6.	Test track or site:	Jiangsu Huachen Vehicle Inspection Co., Ltd. Xihuan Road, Xinqiao, Danbei, Danyang, Jiangsu, China

2. Test results

2.1. Front position lamp MA

2.1.1. Luminous intensity distribution

2.1.1.1. Sample No. 1, normal mode, 2*LEDs lit together, test voltage 13.5V.

No.	Point of the measurement		X [°]	Y [°]	Limits [cd]		Measured values [cd]	
					Min.	Max.	30 minutes	1 minute
1	5L	10U	-5.00	10.00	0.80	140.00	117.50	120.21
2	5R	10U	5.00	10.00	0.80	140.00	82.11	84.00
3	20R	5U	20.00	5.00	0.40	140.00	50.33	51.49
4	10R	5U	10.00	5.00	0.80	140.00	86.25	88.24
5	H	5U	0.00	5.00	2.80	140.00	118.83	121.57
6	10L	5U	-10.00	5.00	0.80	140.00	109.40	111.92
7	20L	5U	-20.00	5.00	0.40	140.00	70.82	72.45
8	10L	V	-10.00	0.00	1.40	140.00	71.19	72.83
9	5L	V	-5.00	0.00	3.60	140.00	101.19	103.52
10	H	V	0.00	0.00	4.00	140.00	117.93	120.65
11	5R	V	5.00	0.00	3.60	140.00	84.41	86.36
12	10R	V	10.00	0.00	1.40	140.00	52.33	53.54
13	20R	5D	20.00	-5.00	0.40	140.00	37.99	38.87
14	10R	5D	10.00	-5.00	0.80	140.00	75.57	77.31
15	H	5D	0.00	-5.00	2.80	140.00	97.72	99.97
16	10L	5D	-10.00	-5.00	0.80	140.00	90.61	92.70
17	20L	5D	-20.00	-5.00	0.40	140.00	41.48	42.44
18	5L	10D	-5.00	-10.00	0.80	140.00	80.83	82.69
19	5R	10D	5.00	-10.00	0.80	140.00	66.97	68.51
20	Visibility defined by Annex 1		(-80.00) 20.00	(15.00) -10.00	0.05	140.00	Min. 1.83	1.87
							Max. 121.63	124.44

2.1.1.2. Sample No. 2, normal mode, 2*LEDs lit together, test voltage 13.5V.

No.	Point of the measurement		X [º]	Y [º]	Limits [cd]		Measured values [cd]	
					Min.	Max.	30 minutes	1 minute
1	5L	10U	-5.00	10.00	0.80	140.00	80.83	83.36
2	5R	10U	5.00	10.00	0.80	140.00	113.23	116.78
3	20R	5U	20.00	5.00	0.40	140.00	63.18	65.16
4	10R	5U	10.00	5.00	0.80	140.00	92.53	95.43
5	H	5U	0.00	5.00	2.80	140.00	106.31	109.64
6	10L	5U	-10.00	5.00	0.80	140.00	76.29	78.68
7	20L	5U	-20.00	5.00	0.40	140.00	44.40	45.79
8	10L	V	-10.00	0.00	1.40	140.00	54.90	56.62
9	5L	V	-5.00	0.00	3.60	140.00	80.79	83.32
10	H	V	0.00	0.00	4.00	140.00	115.28	118.89
11	5R	V	5.00	0.00	3.60	140.00	97.88	100.95
12	10R	V	10.00	0.00	1.40	140.00	68.60	70.75
13	20R	5D	20.00	-5.00	0.40	140.00	40.46	41.73
14	10R	5D	10.00	-5.00	0.80	140.00	88.95	91.74
15	H	5D	0.00	-5.00	2.80	140.00	95.75	98.75
16	10L	5D	-10.00	-5.00	0.80	140.00	71.64	73.88
17	20L	5D	-20.00	-5.00	0.40	140.00	34.05	35.12
18	5L	10D	-5.00	-10.00	0.80	140.00	60.18	62.06
19	5R	10D	5.00	-10.00	0.80	140.00	77.31	79.73
20	Visibility defined by Annex 1		(80.00) -20.00	(15.00) -10.00	0.05	140.00	Min. 1.56	1.61
							Max. 119.67	123.42

2.1.2. Colour – White

	Measured values		Limits
Sample	x	y	W12 green boundary: y = 0.150 + 0.640 x W23 yellowish green boundary: y = 0.440 W34 yellow boundary: x = 0.500 W45 reddish purple boundary: y = 0.382 W56 purple boundary: y = 0.050 + 0.750 x W61 blue boundary: x = 0.310
No. 1	0.3266	0.3307	Complies
No. 2	0.3273	0.3295	Complies

2.2. Headlamp (Passing beam, Class CS) – UN Regulation No. 149.00

2.2.1. Intensity of light emitted

2.2.1.1. Sample No. 1, test voltage 13.2V.

No.	Point of the measurement	Limits [cd]		Measured values [cd]		Conclusion
		Minimum	Maximum	After 1 min	After stability	
1	0.86D-3.5R	2000.00	13750.00	3913.03	3598.63	Complies
2	0.86D-H	2450.00	---	4045.98	3720.90	Complies
3	0.86D-3.5L	2000.00	13750.00	4993.28	4592.09	Complies
4	0.5U-1.5L	---	900.00	435.51	400.52	Complies
5	0.5U-1.5R	---	900.00	465.94	428.50	Complies
6	2D-15L	550.00	---	8136.38	7482.65	Complies
7	2D-15R	550.00	---	9327.21	8577.80	Complies
8	4D-20L	150.00	---	3049.39	2804.38	Complies
9	4D-20R	150.00	---	6304.58	5798.03	Complies
10	HV	---	1700.00	921.29	847.27	Complies
11	Line 1	1350.00	---	10946.27	10066.78	Complies
12	point 8	---	700.00	178.74	164.38	Complies
13	point 9	---	700.00	205.81	189.27	Complies
14	point 10	---	700.00	215.29	197.99	Complies
15	Total (8-10)	150.00	---	599.83	551.64	Complies
16	point 11	---	900.00	305.27	280.74	Complies
17	point 12	---	900.00	301.57	277.34	Complies
18	point 13	---	900.00	329.28	302.82	Complies
19	Total (11-13)	300.00	---	936.11	860.90	Complies
20	V-8L	50.00	---	470.75	432.93	Complies
21	V-8R	50.00	---	1114.14	1024.62	Complies
22	V-4L	100.00	900.00	766.13	704.57	Complies
23	V-4R	100.00	900.00	703.76	647.22	Complies
24	Zone I	---	900.00	766.91	705.29	Complies
25	Zone II	---	700.00	218.97	201.38	Complies

2.2.1.2. Sample No. 2, test voltage 13.2V.

No.	Point of the measurement	Limits [cd]		Measured values [cd]		Conclusion
		Minimum	Maximum	After 1 min	After stability	
1	0.86D-3.5R	2000.00	13750.00	3821.98	3501.43	Complies
2	0.86D-H	2450.00	---	4155.89	3807.33	Complies
3	0.86D-3.5L	2000.00	13750.00	4812.47	4408.84	Complies
4	0.5U-1.5L	---	900.00	464.86	425.87	Complies
5	0.5U-1.5R	---	900.00	488.06	447.13	Complies
6	2D-15L	550.00	---	7781.88	7129.20	Complies
7	2D-15R	550.00	---	9933.03	9099.93	Complies
8	4D-20L	150.00	---	3419.89	3133.06	Complies
9	4D-20R	150.00	---	6439.48	5899.39	Complies
10	HV	---	1700.00	912.43	835.90	Complies
11	Line 1	1350.00	---	10741.02	9840.16	Complies
12	point 8	---	700.00	204.89	187.71	Complies
13	point 9	---	700.00	188.49	172.68	Complies
14	point 10	---	700.00	197.17	180.63	Complies
15	Total (8-10)	150.00	---	590.55	541.02	Complies
16	point 11	---	900.00	276.84	253.62	Complies
17	point 12	---	900.00	291.00	266.59	Complies
18	point 13	---	900.00	295.54	270.75	Complies
19	Total (11-13)	300.00	---	863.37	790.96	Complies
20	V-8L	50.00	---	460.06	421.47	Complies
21	V-8R	50.00	---	1206.84	1105.62	Complies
22	V-4L	100.00	900.00	716.58	656.48	Complies
23	V-4R	100.00	900.00	695.50	637.17	Complies
24	Zone I	---	900.00	766.66	702.36	Complies
25	Zone II	---	700.00	205.88	188.61	Complies

2.2.2. Colour – White

2.2.2.1. After 1 minute

	Measured values		Limits
Sample	x	y	W12 green boundary: y = 0.150 + 0.640 x W23 yellowish green boundary: y = 0.440 W34 yellow boundary: x = 0.500 W45 reddish purple boundary: y = 0.382 W56 purple boundary: y = 0.050 + 0.750 x W61 blue boundary: x = 0.310
No. 1	0.3227	0.3278	Complies
No. 2	0.3242	0.3263	Complies

2.2.2.2. After stability

	Measured values		Limits
Sample	x	y	W12 green boundary: y = 0.150 + 0.640 x W23 yellowish green boundary: y = 0.440 W34 yellow boundary: x = 0.500 W45 reddish purple boundary: y = 0.382 W56 purple boundary: y = 0.050 + 0.750 x W61 blue boundary: x = 0.310
No. 1	0.3231	0.3282	Complies
No. 2	0.3247	0.3266	Complies

2.3. Headlamp (Driving beam) – UN Regulation No. 149.00

2.3.1. Intensity of light emitted

2.3.1.1. Sample No. 1, test voltage 13.2V.

No.	Point of the measurement	Limits [cd]		Measured values [cd]		Conclusion
		Minimum	Maximum	After 1 min	After stability	
1	HV	20000.00	---	31892.15	31327.63	Complies
2	H-2.5R	10000.00	---	25564.19	25111.68	Complies
3	H-2.5L	10000.00	---	21705.31	21321.11	Complies
4	H-5R	3500.00	---	18716.73	18385.43	Complies
5	H-5L	3500.00	---	16089.62	15804.82	Complies
6	H-9R	2000.00	---	5154.52	5063.28	Complies
7	H-9L	2000.00	---	4726.36	4642.70	Complies
8	H-12R	600.00	---	1502.54	1475.94	Complies
9	H-12L	600.00	---	1294.06	1271.15	Complies
10	2U-V	1000.00	---	19632.76	19285.24	Complies
11	I_{max}	25000.00	215000.00	32636.41	32058.72	Complies

2.3.1.2. Sample No. 2, test voltage 13.2V.

No.	Point of the measurement	Limits [cd]		Measured values [cd]		Conclusion
		Minimum	Maximum	After 1 min	After stability	
1	HV	20000.00	---	32275.41	31659.70	Complies
2	H-2.5R	10000.00	---	26093.42	25595.64	Complies
3	H-2.5L	10000.00	---	22146.04	21723.57	Complies
4	H-5R	3500.00	---	15388.44	15094.88	Complies
5	H-5L	3500.00	---	15244.25	14953.44	Complies
6	H-9R	2000.00	---	5168.22	5069.63	Complies
7	H-9L	2000.00	---	3692.79	3622.34	Complies
8	H-12R	600.00	---	1658.49	1626.85	Complies
9	H-12L	600.00	---	1367.51	1341.42	Complies
10	2U-V	1000.00	---	21272.54	20866.7[illegible]	Complies
11	I_{max}	25000.00	215000.00	32819.67	3219[illegible].58	Complies

Reference Mark (Imax / 4300): 7.5 *Average of the value for Sample No. 1 and Sample No. 2.

2.3.2. Colour – White

2.3.2.1. After 1 minute

	Measured values		Limits
Sample	x	y	W12 green boundary: y = 0.150 + 0.640 x W23 yellowish green boundary: y = 0.440 W34 yellow boundary: x = 0.500 W45 reddish purple boundary: y = 0.382 W56 purple boundary: y = 0.050 + 0.750 x W61 blue boundary: x = 0.310
No. 1	0.3195	0.3241	Complies
No. 2	0.3206	0.3229	Complies

2.3.2.2. After stability

	Measured values		Limits
Sample	x	y	W12 green boundary: y = 0.150 + 0.640 x W23 yellowish green boundary: y = 0.440 W34 yellow boundary: x = 0.500 W45 reddish purple boundary: y = 0.382 W56 purple boundary: y = 0.050 + 0.750 x W61 blue boundary: x = 0.310
No. 1	0.3198	0.3245	Complies
No. 2	0.3211	0.3234	Complies

2.4. Test record of the photometric measurement in different positions, sample No. 1 and No. 2, test voltage 13.2V.

2.4.1. Passing beam (+2°)

No.	Point of the measurement	X [°]	Y [°]	Limits [cd]		Measured values [cd]	
				Min.	Max.	Sample No. 1	Sample No. 2
1	0.86D-H	0	-0.86	2450.00	-	3664.28	3735.61
2	HV	0	0	-	1700.00	812.95	802.59

2.4.2. Passing beam (-2°)

No.	Point of the measurement	X [°]	Y [°]	Limits [cd]		Measured values [cd]	
				Min.	Max.	Sample No. 1	Sample No. 2
1	0.86D-H	0	-0.86	2450.00	-	3589.12	3665.32
2	HV	0	0	-	1700.00	775.22	757.49

2.4.3. Driving beam (+2°)

No.	Point of the measurement	X [°]	Y [°]	Limits [cd]		Measured values [cd]	
				Min.	Max.	Sample No. 1	Sample No. 2
1	HV	0	0	20000.00	-	30965.34	31286.94
2	I_{max}	-	-	25000.00	215000.00	31828.96	31955.47

2.4.4. Driving beam (-2°)

No.	Point of the measurement	X [°]	Y [°]	Limits [cd]		Measured values [cd]	
				Min.	Max.	Sample No. 1	Sample No. 2
1	HV	0	0	20000.00	-	30607.22	30824.75
2	I_{max}	-	-	25000.00	215000.00	31548.76	31689.07

2.5. Tests for stability of photometric performance of headlamps in operation – Annex 7 of UN R149.00

2.5.1. Test for stability of photometric performance - Sample No. 1

No.	Point of the measurement		Limit change	Measured values [cd]		
			Δ ± 10%	Clean – prior to test	Clean – after 12 hours	Dirty – after 1 hour
1	Passing beam	0.86D-3.5R	3.91%	3598.63	3736.59	3882.61
2		0.86D-3.5L	3.37%	4592.09	4744.08	4903.78
3		0.5U-1.5L*	33.44cd	400.52	433.96	466.19
4		0.5U-1.5R*	36.12cd	428.50	458.15	494.27
5	Driving beam	$I_{max.}$	1.35%	32058.72	31632.57	31205.89

* The value measured at Point 0.5U-1.5L and 0.5U-1.5R shall not exceed the photometric value measured prior to the test by more than 255cd.

2.6. Test for change in vertical position of the cut-off line under influence of heat

No.	Measurement values		
	Change	Limits	Conclusion
1	0.52 mrad	~~Upwards < 1.0 mrad~~ Downwards < 2.0 mrad	Complies

2.7. Tests for lamps incorporating lenses of plastic material – Annex 8 of UN R149.00

2.7.1.	Test report for plastic material of the lens attached to the manufacturer's information document.

2.8. Test of the complete headlamp – resistance to mechanical deterioration of the lens surface

2.8.1. Sample No. 1

No.	Point of the measurement	X [°]	Y [°]	Limits [cd]		Measured values [cd]
				Minimum	Maximum	
1	HV	0	0	-	2210.00	971.85
2	0.86D-3.5R	3.50	-0.86	1800.00	17875.00	4021.36
3	0.86D-3.5L	-3.50	-0.86	1800.00	17875.00	5076.48

2.9. Test of the complete headlamp – test of adherence of coatings

2.9.1.	Sample No. 2	No appreciable impairment of the gridded area - complies

2.10. Test record of LED modules

2.10.1. Test voltage 13.2V

2.10.1.1. Red Content

	Limit	measured	Conclusion
Passing beam	$K_{red} \geq 0.05$	0.0733	Complies
Driving beam	$K_{red} \geq 0.05$	0.0705	Complies

2.10.1.2. UV-radiation

	Limit	measured	Conclusion
Passing beam	$K_{UV} \leq 10^{-5}$ W/lm	7.14×10^{-7}	Complies
Driving beam	$K_{UV} \leq 10^{-5}$ W/lm	7.56×10^{-7}	Complies

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2.10.1.3. Objective Luminous Flux

	Limit		Measured	Conclusion
	Minimum	Maximum		
Passing beam	500.00	2000.00	754.36 lm	Complies
Driving beam	---	---	826.33 lm	Complies

2.11. Apparent surface

[Unit: mm]	Limit (O)	Limit (I)	Limit (U)	Limit (D)
Passing beam	29	29	28	28
Driving beam	29	106	28	64
Front position lamp	92	84	37	100

3. Specimen submitted to test on: 2023-05-26

4. Date of test: 2023-06-19 to 2023-06-20

III. Manufacturer's information folder

No. HLY002-00

11 pages total of 2023-05-26

IV. Other documentation

No other documentation

V. Attachments

No attachments

The results presented above relate to the tested items only and to the sample as provided by the customer.
Measuring and test equipment and test site meet the requirements of the applicable legislation.
This report shall never be reproduced incomplete and without a written permission of the testing laboratory. TÜV SÜD Czech confidentiality degree: confidential

VI. Final assessment

The described sample in tested items

complies

with the requirements of UN Regulation No. 148.00, 149.00
for issue of approval certificate

This technical report consists of pages No. 1 to 14.

Henry Chen
Test executive

Luděk Piskač
Officially recognized expert

Prague, 2023-06-25

End of the technical report

TÜV SÜD Czech s.r.o. TECHNICAL SERVICE E8/C